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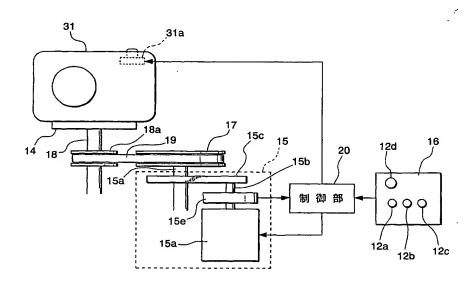
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- (54) Title: SMALL AUTOMATIC MOTION CONTROL PHOTOGRAPHING SYSTEM
- (54) 発明の名称: 小型自動モーションコントロール撮影装置



20...CONTROL SECTION

(57) Abstract: A small automatic motion control photographing system comprising a table supported to turn at least uni-directionally, a servo motor generating a driving force for turning the table, and a mechanism for transmitting the driving force generated from the servo motor to the table wherein the table is stopped every time it is turned uni-directionally a specified rotational amount in order to take a photograph by means of a digital camera secured to the table. The small automatic motion control photographing system is excellent in portability and a panoramic photograph can be taken readily when the camera is fixed.

(57) 要約: 少なくとも一方向に回転可能に支持されたテーブルと、テーブルを回転させるための駆動力を発生するサーボモータと、サーボモータが発生する駆動力をテーブルに伝達する駆動力伝達機構とを備え、テーブ

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ルに固定したデジタルカメラによる撮影を行うために、テーブルを一方向に回転させながら所定の回転量ごとに停止させる小型自動モーションコントロール撮影装置。かかる小型自動モーションコントロール撮影装置は携帯性が良く、カメラを取り付ければ容易にパノラマ撮影が可能となる。

1

明細書

小型自動モーションコントロール撮影装置

技術分野

本発明は、パノラマ写真を撮影するためにカメラを支持して回転させる小型自動モーションコントロール撮影装置に関する。

本出願は日本国特許出願第2003-8257号を基礎としており、その内容 を本明細書に組み込む。

背景技術

広い視野を撮影した写真、いわゆるパノラマ写真を撮影するには、視野が展開する方向にカメラを回転させながら連続的に複数枚の写真を撮り、これらの写真を繋ぎ合わせて作られる。

公知文献には、三脚に回転自在に取り付けられたカメラと、カメラから出力される画像データを処理するコンピュータと、コンピュータにより処理された画像に基づいてパノラマ画像を表示するCRTと、パノラマ画像のハードコピーを出力するプリンタと、コンピュータにより処理されたパノラマ画像の画像データを磁気記録媒体に記録するディスクドライバとを有し、カメラを360°自由に回転させて被写体を撮影する小型自動モーションコントロール撮影装置が記載されている。しかしながら、この小型自動モーションコントロール撮影装置は、カメラをコンピュータその他の機器に接続して使用するようになっており、携帯して気軽に撮影を行うという思想に基づいて考案されたものではない(特開平6-189180号公報(第3-5頁、第1図参照)

また、近年、デジタルカメラの普及により、デジタル画像をパソコン上で加工して簡単にパノラマ写真を製作できるようになっている。しかしながら、パノラマ写真のもとになるべき連続した複数枚の写真を簡単、かつ正確に撮影することは非常に難しく、また、その作業を代替する機器も存在しなかった。

発明の開示

本発明は、このような事情を考慮してなされたもので、携帯性が良く、かつカメラを取り付けて容易にパノラマ撮影が可能となる小型自動モーションコントロール撮影装置を提供することを目的とする。

本発明は、上記課題を解決するため、以下の手段を採用する。

本発明の第一実施態様に係る小型自動モーションコントロール撮影装置は、少なくとも一方向に回転可能に支持されたカメラ固定手段と、該カメラ固定手段を回転させるための駆動力を発生するサーボモータと、該サーボモータが発生する駆動力を前記カメラ固定手段に伝達する駆動力伝達機構とを備え、前記カメラ固定手段に固定したカメラによる撮影を行うために、前記カメラ固定手段を一方向に回転させながら所定の回転量ごとに停止させる。

本発明の第二実施態様において、第一実施態様に係る小型自動モーションコントロール撮影装置における前記駆動力伝達機構にタイミングベルトが組み合わせられる。

本発明の第三実施態様に係る小型自動モーションコントロール撮影装置は、回転可能に支持されたカメラ固定手段と、該カメラ固定手段を回転させるための駆動力を発生するサーボモータと、前記サーボモータへの電源投入時、該サーボモータの駆動軸に設けた回転量検出手段の検出結果に基づいて前記駆動軸の基準位置からの回転方向および回転量を検出し、検出された回転方向および回転量に基づいて前記駆動軸を基準位置に戻すべく前記駆動軸を回転させる制御部とを備える。

本発明においては、カメラを固定したカメラ固定手段を一方向に回転させながら所定の回転量ごとに停止させ、各停止時にカメラによる撮影を行うことにより、パノラマ写真のもとになるべき連続した複数枚の写真を、人手によらず自動的に撮影できる。この小型自動モーションコントロール撮影装置を三脚等に固定して撮影された写真は、いずれも視野が展開する方向に等間隔に離間した映像となり、しかも上下のぶれがなく、パノラマ写真に加工したときの仕上がりも美しいという顕著な効果を有する。

図面の簡単な説明

図1はこの発明における実施の形態に係る小型自動モーションコントロール撮 影装置の正面から見た斜視図である。

図2はこの発明における実施の形態に係る小型自動モーションコントロール撮 影装置の一部の内部構造の斜視図である。

図3はこの発明における実施の形態に係る小型自動モーションコントロール撮 影装置の背面から見た斜視図である。

図4はこの発明における実施の形態に係る小型自動モーションコントロール撮影装置の背面から見た斜視図である。

図5はこの発明における実施の形態に係る小型自動モーションコントロール撮 影装置の制御あるいは駆動を示すブロック図である。

発明を実施するための最良の形態

以下、この発明の実施の形態について、図面を参照して説明する。

小型自動モーションコントロール撮影装置10は、図1に示すように、本体1 1が略直方体の形状をなし、その前面及び側面には、着脱が可能なカバー12が 取り付けられている。また、図2に示すように、本体11の底部、中央部、及び 上部には、それぞれ略矩形の形状とされた底部板11a、中央部板11b、上部 板11cが配置されている。また、底部板11aと中央部板11bとの間には、 その底部板11aに立設して中央部板11bを支持する複数の支柱11dが配置 され、中央部板11bと上部板11cとの間には、その中央部板11bに立設し て上部板11cを支持する複数の支柱11eが配置されている。

図3に示すように、本体11の背面には、電源として外付けのバッテリ30、例えばリチウムイオンバッテリが着脱可能となるように構成された壁部13が形成されている。このバッテリ30は、壁部13に対して図4のように装着される。ここで、バッテリ30を含まない本体11の概略外形寸法は、幅70mm、高さ58mm、長さ58mmである。

本体11の上部には、パノラマ撮影を行うためのデジタルカメラ31を固定す

るテーブル(カメラ固定手段)14が設けられている。テーブル14は、中央部板11bに下端を、上部板11cに中間部をそれぞれ回転自在に支持され、上端を上部板11cから突き出した回転軸18の上端に固定されている。テーブル14は上面が平坦な板状で、厚さ方向に貫通孔が形成されており、この貫通孔にボルトを通してデジタルカメラ31下面の三脚固定用のネジ孔に螺着することによりデジタルカメラ31を固定できるようになっている。

また、中央部板11bには、回転軸18をテーブル14ごと回転させるための駆動力を発生するサーボモータ15aを内蔵するサーボモータユニット15が取り付けられている。サーボモータユニット15には、図5に示すように、サーボモータ15aの他に、サーボモータ15aの出力軸15bの回転を減速してトルクを増幅させる歯車機構15cと、歯車機構15cによってトルクを増幅された出力軸15bの回転を取り出す駆動軸15dと、出力軸15bの基準位置からの回転方向および回転量を検出するポテンショメータ(回転量検出手段)15eが設けられている。

サーボモータユニット15の駆動軸15dには駆動ベルト車17が取り付けられ、回転軸18には従動ベルト車18aが取り付けられ、駆動ベルト車17と従動ベルト車18aとの間には歯付きのタイミングベルト19が掛けられている。駆動ベルト車17と従動ベルト車18aとの回転比は1:2に設定されており、駆動軸15dの回転量が倍化されて回転軸18に伝達されるようになっている(ここでは、歯車機構15cと、駆動軸15dと、駆動ベルト車17および従動ベルト車18a間に掛けられたタイミングベルト19とが、サーボモータ15aの駆動力をテーブル14に伝達する駆動力伝達機構を構成している)。

また、本体11の内部には、サーボモータ15aを制御するとともにデジタルカメラ31のシャッタ機構31aを作動させる制御部20が設けられており、カバー12の前面には、サーボモータ15aおよび制御部20への電源投入、ならびに撮影動作のパターンを選択するための入力部16が設けられている。入力部16は、3個のボタン12a、12b、12cからなり、各ボタン12a、12b、12cの上部には、電源投入時に点灯するランプ12dが配置されている。

制御部20は、入力部16の各ボタン12a、12b、12c、サーボモータ 15a、ポテンショメータ15eのそれぞれに接続されている。また、制御部2 0は、デジタルカメラ31のシャッタ機構31aに接続されており、シャッタ機構31aに対して電気信号を送出することでシャッタ機構31aを作動させるようになっている。

次に、上記のように構成された小型自動モーションコントロール撮影装置10 による撮影の仕方について説明する。

まず、図3に示すように、本体11にバッテリ30を矢印の方向に装着し、小型自動モーションコントロール撮影装置10の電源を確保する。なお、本実施の形態においてはバッテリ30によって電源を確保しているが、バッテリ30に限らず、例えば、屋内に小型自動モーションコントロール撮影装置10を固定する場合には、ACアダプタを接続することによって電源を確保してもよい。

電源を確保した後、ボタン12aを押して電源を投入する。電源を投入すると、ランプ12dが点灯するとともに、ポテンショメータ15eが出力軸15bの基準位置からの回転方向および回転量を検出し、出力軸15bの基準位置からのズレに相当する検出結果を制御部20に送出する。制御部20は、ポテンショメータ15eの検出結果に基づき、出力軸15bを基準位置に戻すべくサーボモータ15aを駆動する。サーボモータ15aが駆動されると、デジタルカメラ31を載せたテーブル14が回転し、デジタルカメラ31の前面を小型自動モーションコントロール撮影装置10の本体11前面に一致させる(この位置をデジタルカメラ31の初期位置とする)。

次に、デジタルカメラ31の各撮影ショット間の回転量を設定する。本実施の 形態においては、各撮影ショット間の回転量が30°に初期設定されているので、 その回転量を20°に変更する場合は、ボタン12a、12cを同時に押下する。 また、フラッシュ撮影を行う際には、ボタン12a、12bを同時に押下する。

続いて、パノラマ写真の展開角度を設定する。本実施の形態においては、ボタン12aを押下すると展開角度が60°に、ボタン12bを押下すると180°に、ボタン12cを押下すると360°に設定される。

上記のように3つのボタン12a、12b、12cを操作すると、制御部20 に所望の撮影動作のパターンが入力される。さらに、パノラマ写真の展開角度を設定するために3つのボタン12a、12b、12cのいずれかを押下することを契機としてパノラマ撮影が開始される。以下では、各撮影ショット間の回転量

を30°、展開角度を360°に設定した場合について説明する。

パノラマ撮影の開始が指示されると、制御部20は、サーボモータ15aを駆動してデジタルカメラ31を初期位置から左方向に90°回転させて停止させ、デジタルカメラ31のシャッタ機構31aを作動させて1枚目の写真を撮影する。サーボモータ15aが駆動されると、出力軸15bの回転が歯車機構15cを介して駆動軸15dに伝達され、駆動軸15dの回転が駆動ベルト車17、タイミングベルト19、従動ベルト車18aを介して回転軸18に伝達され、デジタルカメラ31を載せたテーブル14が回転する。サーボモータユニット15の内部では、ポテンショメータ15eによって出力軸15bの回転量が常時検出されており、出力軸15bがテーブル14を90°回転させるのに見合う回転量だけ回転したら、その位置で出力軸15bを停止させる。

次に、制御部20は、サーボモータ15aを駆動してデジタルカメラ31を右方向に30°回転させて停止させ、デジタルカメラ31のシャッタ31aを作動させて2枚目の写真を撮影する。以降はこの動作を繰り返して3枚目、4枚目、・・・と写真を撮影する。デジタルカメラ31が初期位置から右方向に240°回転させて12枚目の写真を撮影したら、制御部20は、サーボモータ15aを駆動してデジタルカメラ31を左方向に240°回転させ、初期位置に戻して停止させる。

撮影を終えたら、デジタルカメラ31に内蔵されたメモリから画像データをパ ソコンに移植し、専用のソフトウェアを使ってパノラマ写真に加工する。

上記のように構成された小型自動モーションコントロール撮影装置10においては、体積が小さく重量が軽いうえ、低消費電力で大きなトルクを発生させる小型のサーボモータ15aを内蔵したサーボモータユニット15を使用することにより、装置自体が小型で軽量に仕上げられている。

また、写真撮影の過程でテーブル14を一方向に回転させることにより、サーボモータユニット15の歯車機構15cが内包する問題、すなわちバックラッシに起因する回転量のブレを回避することができ、これによって撮影された写真はいずれも視野が展開する方向に等間隔に離間した映像となる。さらに、駆動力伝達機構に歯付きのタイミングベルト19を有するベルト伝達機構を組み合わせたことにより、駆動力がロスなく伝達されるので、これによっても回転量のブレを

回避することができる。

また、電源断時に例えば外力が作用することによってテーブル14が回転し、 デジタルカメラ31が初期位置になくても、電源投入時にサーボモータが駆動し てデジタルカメラ31を初期位置に復帰させるので、写真撮影のアングルを決定 し易くなる。

上記のように構成された小型自動モーションコントロール撮影装置10によれば、パノラマ写真のもとになるべき連続した複数枚の写真を、人手によらず自動的に撮影できる。この小型自動モーションコントロール撮影装置を三脚等に固定して撮影された写真は、いずれも視野が展開する方向に等間隔に離間した映像となり、しかも上下のぶれがなく、パノラマ写真に加工したときの仕上がりも美しい。

なお、本実施の形態においては、カバー12に配置されたボタン12a、12b、12cおよびランプ12dが本体11の正面に配置され、壁部13およびその壁部13に取り付けられたバッテリ30が本体11の背面に配置されているが、それぞれが反対の位置となる構成、すなわち、カバー12に配置されたボタン12a、12b、12cおよびランプ12dが本体11の背面に配置され、壁部13およびその壁部13に取り付けられたバッテリ30が本体11の正面に配置されてもよい。

この場合、デジタルカメラ31の背面から撮影者がパノラマ撮影を行おうとする被写体を直接視認しながら回転量および回転角度の設定が可能であるという利点がある。

産業上の利用可能性

以上説明したように、本発明によれば、携帯性が良く、かつカメラを取り付けて容易にパノラマ撮影が可能となる小型自動モーションコントロール撮影装置を提供することができる。

請求の範囲

1. 小型自動モーションコントロール撮影装置であって、

少なくとも一方向に回転可能に支持されたカメラ固定手段と、

該カメラ固定手段を回転させるための駆動力を発生するサーボモータと、

該サーボモータが発生する駆動力を前記カメラ固定手段に伝達する駆動力伝達 機構とを備え、

前記カメラ固定手段に固定したカメラによる撮影を行うために、前記カメラ固定手段を一方向に回転させながら所定の回転量ごとに停止させる。

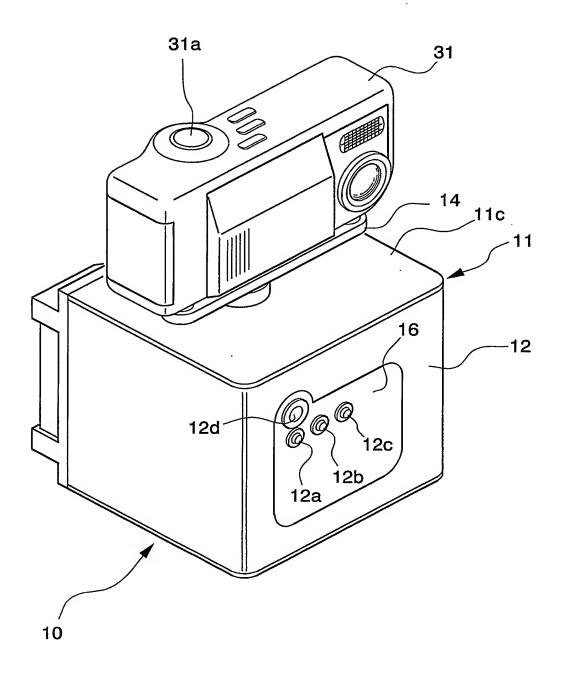
- 2. 請求項1記載の小型自動モーションコントロール撮影装置であって、前記 駆動力伝達機構がタイミングベルトと組み合わされている。
- 3. 小型自動モーションコントロール撮影装置であって、

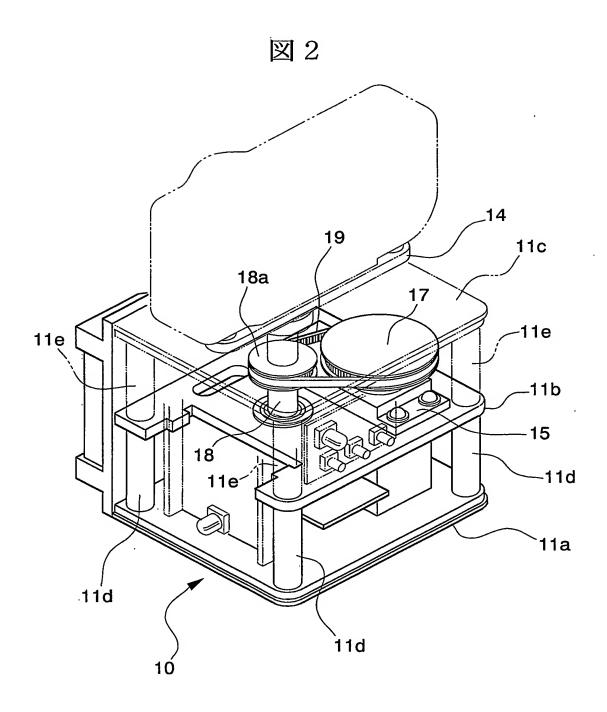
回転可能に支持されたカメラ固定手段と、

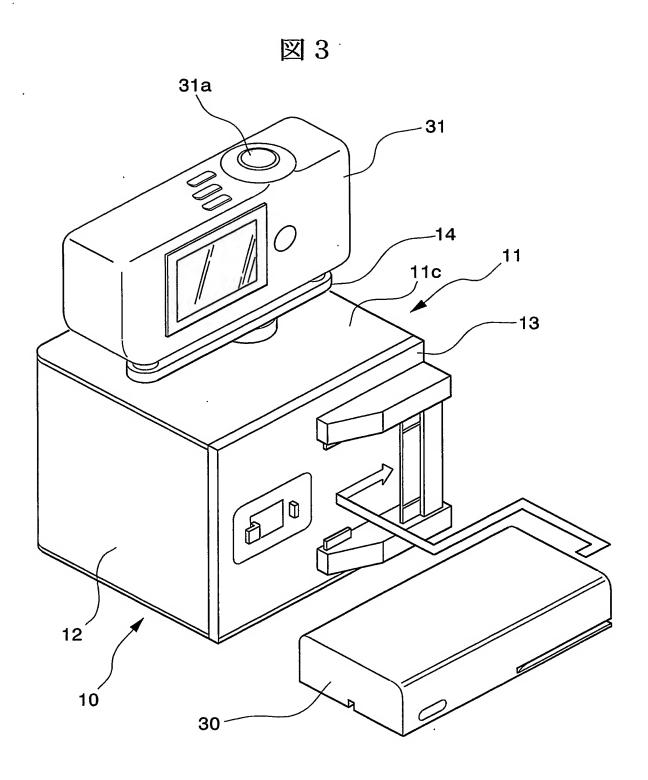
. 該カメラ固定手段を回転させるための駆動力を発生するサーボモータと、

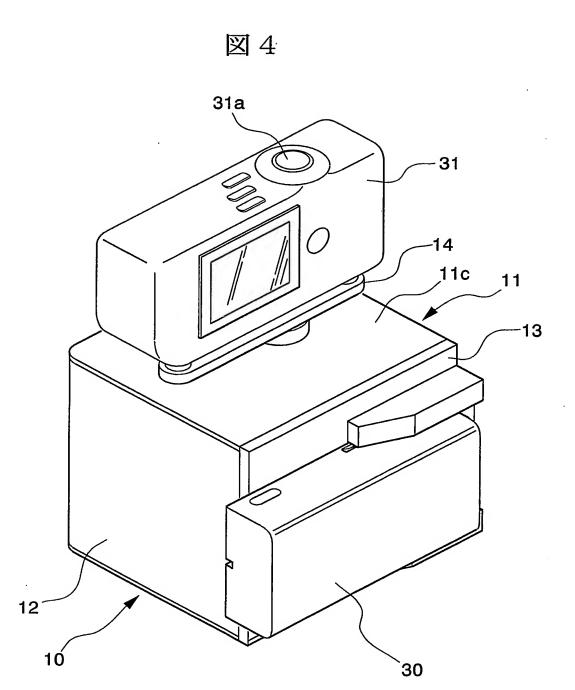
前記サーボモータへの電源投入時、該サーボモータの駆動軸に設けた回転量検 出手段の検出結果に基づいて前記駆動軸の基準位置からの回転方向および回転量 を検出し、検出された回転方向および回転量に基づいて前記駆動軸を基準位置に 戻すべく前記駆動軸を回転させる制御部とを備える。

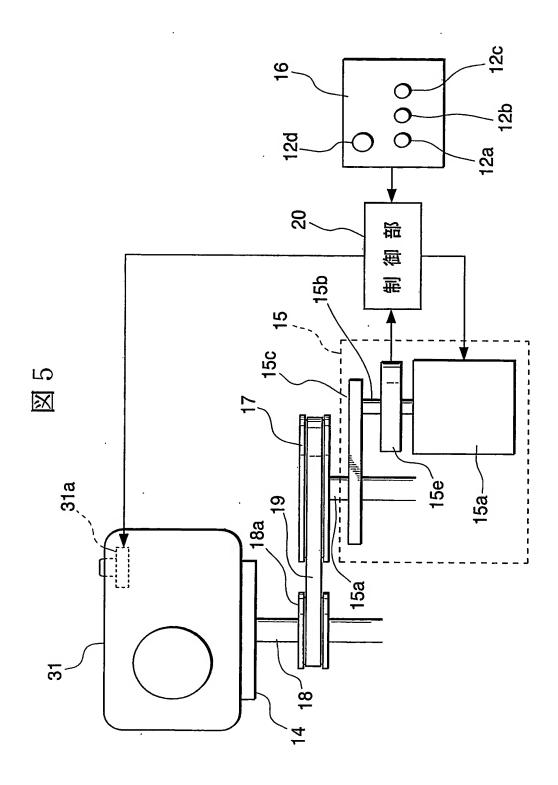
図 1











INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP03/01722

A. CLASSIFICATION OF SUBJECT MATTER Int. C17 H04N5/222, 5/225 // H04N101:00 According to International Patent Classification (IPC) or to both national classification and IPC B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) Int. C17 H04N5/222, 5/225 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Roho 1996–2003 Kokai Jitsuyo Shinan Koho 1971–2003 Toroku Jitsuyo Shinan Koho 1994–2003 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Electronic data base consulted during the international search terms used) Electronic data base consulted during the international search terms used) Electronic data base consulted during the international search terms used) Table properties and the search terms used) Electronic data base consulted during the international search terms used) Electronic data base consulted during the international search terms used) Electronic data base consulted during the international search terms used) Electronic data base consulted during the search used to cause the consulted during the international search terms used) Electronic data base consulted during the search terms used to cause the consulted during the international filing data o					
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) Int.C1' H04N5/222, 5/225 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922–1996 Jitsuyo Shinan Toroku Koho 1996–2003 Rokai Jitsuyo Shinan Koho 1971–2003 Toroku Jitsuyo Shinan Koho 1994–2003 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) C. DOCUMENTS CONSIDERED TO BE RELEVANT Category* Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. X JF 7-30802 A (Nikon Corp.), 31 January, 1995 (31.01.95), Full text; Figs. 1 to 7 (Family: none) A JP 2000-2927 A (Olympus Optical Co., Ltd.), 77 (Family: none) A JP 2000-2927 A (Olympus Optical Co., Ltd.), 79 January, 2000 (07.01.00), Full text; Figs. 1 to 10 (Family: none) Further documents are listed in the continuation of Box C. See patent family annex. The document of fifting the percent state of the nat which is not considered to be of particals relevance and considered to be of particals relevance and special reason (as specified) The document of particular relevance; the claimed investion cannot be considered to involve an inventive as special reason (as specified) The document terring to an oral disclosure, use, establishing or other manner and the principle or the countern is taken above considered convertive stay when the document is taken above considered or investive an inventive stay when the document is taken above considered to involve an inventive stay when the document is taken above considered to involve an inventive stay when the document is taken above considered to involve an inventive stay when the document is taken above considered to involve an inventive stay when the document is taken above considered to involve an inventive stay when the document is taken above considered to involve an inventive sta	A. CLASSIFICATION OF SUBJECT MATTER Int.Cl ⁷ H04N5/222, 5/225 // H04N101:00				
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国際調査報告

国際出願番号 PCT/JP03/01722

A. 発明の属する分野の分類(国際特許分類 (IPC))	A. 発明の属する分野の分類(国際特許分類 (IPC))			
Int. Cl ⁷ H04N5/222, 5/225//H04N101:00				
B. 調査を行った分野				
調査を行った最小限資料(国際特許分類(IPC))・				
Int. Cl' H04N5/222, 5/225				
最小限資料以外の資料で調査を行った分野に含まれるもの				
日本国実用新案公報 1922-199	6年			
日本国実用新案公報 1922-199 日本国公開実用新案公報 1971-200	3年			
日本国実用新案登録公報 1996-200 日本国登録実用新案公報 1994-200	JT,			
国際調査で使用した電子データベース(データベースの名称、調査に使用した用語)				
C. 関連すると認められる文献	<u> </u>			
引用文献の	関連する			
カテゴリー* 引用文献名 及び一部の箇所が関連する	ときは、その関連する箇所の表示 請求の範囲の番号			
X JP 7-30802 A (株式会	社ニコン)1995.01.3 1-3			
1,全文,第1-7図(ファミリー	なし)			
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A JP 2000-2927 A (オ				
000.01.07,全文,第1-	10回 (ノアミリーなし)			
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□ C欄の続きにも文献が列挙されている。 □ パテントファミリーに関する別紙を参照。				
* 引用文献のカテゴリー の日の後に公表された文献				
「A」特に関連のある文献ではなく、一般的技術水準を示す	「T」国際出願日又は優先日後に公表された文献であって 出願と矛盾するものではなく、発明の原理又は理論			
もの 「E」国際出願日前の出願または特許であるが、国際出願日	の理解のために引用するもの			
以後に公表されたもの	「X」特に関連のある文献であって、当該文献のみで発明			
「L」優先権主張に疑義を提起する文献又は他の文献の発行				
日若しくは他の特別な理由を確立するために引用する 「Y」特に関連のある文献であって、当該文献と他の1以 文献 (理由を付す) 上の文献との、当業者にとって自明である組合せに				
「O」 1 頭による開示、使用、展示等に言及する文献 よって進歩性がないと考えられるもの				
「P」国際出願日前で、かつ優先権の主張の基礎となる出願 「&」同一パテントファミリー文献				
国際調査を完了した日 国際調査報告の発送日 03 06 03				
21.05.03	国際調査報告の発送日 03.06.03			
国際調査機関の名称及びあて先	特許庁審査官(権限のある職員) 5 P 8322			
日本国特許庁 (ISA/JP)	関谷 隆一二			
郵便番号100-8915 東京都千代田区霞が関三丁目4番3号	電話番号 03-3581-1101 内線 3502			